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| EXAMINER | |
|---|---|
| YAM, STEPHEN K | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2878 | |

DATE MAILED: 05/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/806,704 | PALME ET AL. | |
| | Examiner | Art Unit | |
| | Stephen Yam | 2878 | |

*-- The MAILING DATE of this communication appears on th cov r she t with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *14 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *41,42 and 45-67* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *41 and 42* is/are allowed.

6)☒ Claim(s) *45-51,53-56,58 and 59* is/are rejected.

7)☒ Claim(s) *52,57 and 60-67* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 14, 2003 has been entered.

### *Claim Objections*

2. Claim 46 is objected to because of the following informalities:

In Claim 46, it is unclear how the bandpass filter can provide an optical signal as an input and an electrical signal as an output, as such operations can only be accomplished using photodetectors and not filters. It appears that Applicant intended for the *converting means* to be provided the optical signal as an input and to provide the electrical signal as an output.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 45-47 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onaka et al. US Patent No. 5,894,362.

Regarding Claims 45, 47, and 49, Onaka et al. teach (see Fig. 2 and 8) a system for monitoring the performance of a WDM multi-wavelength system (see Col. 2, line 61 to Col. 3, line 3), comprising means (10, 44, 46) for converting a portion of an optical signal from the WDM multi-wavelength system at a particular wavelength to an electrical signal (see Col. 4, line 62 to Col. 5, line 4), and means (14, 48) for processing the electrical signal to determine the performance of the WDM multi-wavelength system at the particular wavelength (see Col. 5, lines 5-32) and for controlling the converting means (see Col. 7, lines 4-14) so that each particular wavelength (see Col. 4, lines 45-48 and Col. 7, lines 27-35)of the DWDM multi-wavelength system is processed. Regarding Claim 47, Onaka et al. teach the converting means comprising an optical unit (44, 46) having the optical signal as an input and the particular wavelength portion as an output (see Col. 4, lines 45-47), and a photodetector (12 within (10)) having the particular wavelength portion as an input (see Col. 4, lines 47-50) and the electrical signal as an output. Regarding Claim 49, Onaka et al. teach the optical unit comprising a grating spectrometer (see Col. 4, lines 39-44 and Col. 8, lines 54-56) having the optical signal as an input and providing the particular wavelength portion as an output. Onaka et al. do not teach the WDM system as a DWDM system. It is well known in the art that a WDM system is vastly similar to a DWDM system except for the specific optical characteristics of the transmitted light signals, and that components are often shared between the two system types. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the system of

Onaka et al. for processing DWDM signals, to provide performance evaluation for a newer and higher-bandwidth transmission system while using the same underlying principles as WDM.

Regarding Claim 46, Onaka et al. teach the system in Claim 45, according to the appropriate paragraph above. Onaka et al. also teach (see Fig. 2) the converting means comprising a narrow-band bandpass filter (6), the converting means having the optical signal as an input and providing the electrical signal as an output. Onaka further provides prior art teachings of adjusting/tuning a bandpass filter for monitoring a WDM multi-wavelength system (See Col. 2, lines 23-28). Onaka et al. do not teach the bandpass filter in the system as tunable. It is well known in the art to provide adjustability for optical devices, to alter the optical characteristics of an optical system for a particular wavelength setting or range. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a tunable bandpass filter for the bandpass filter in the system of Onaka et al., to provide a greater range of wavelength coverage for the system through filter adjustment.

5. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Onaka et al. in view of Koga et al. US Patent No. 5,617,234.

Regarding Claim 48, Onaka et al. teach the system in Claim 47, according to the appropriate paragraph above. Onaka et al. do not teach the converting means comprising a lowpass filter having an input coupled to the output of the photodetector and having an output to produce the electrical signal. Koga et al. teach (see Fig. 4) a similar system, with a lowpass filter (19-i) having an input coupled to the output of a photodetector (16-i) and an output to produce the electrical signal (see Col. 6, lines 41-42 and 63-64). It would have been obvious to one of

ordinary skill in the art at the time the invention was made to use a lowpass filter coupled to the output of the photodetector and having the electrical signal as output as taught by Koga et al. in the system of Onaka et al., to enhance the electrical signal quality to improve detection.

6. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Onaka et al. in view of Derickson et al. US Patent No. 5,796,479.

Regarding Claim 50, Onaka et al. teach the system in Claim 49, according to the appropriate paragraph above. Onaka et al. do not teach a movable grating having a wavelength range that covers a measurement range for the DWDM multi-wavelength system, an imaging element for reflecting the optical signal, or a beam deflection system mounted such that the optical signal incident on the imaging element and the optical signal exiting from the imaging element are essentially symmetrical, the movement of the movable grating selecting the particular wavelength portion, and the optical signal being subjected to multiple passes between the movable grating and the imaging element. Derickson et al. teach (see Fig. 1) a similar device, with a grating spectrometer (2) having a grating (14) having a wavelength range that covers a measurement range for a WDM multi-wavelength system (see Col. 3, lines 1-14), an imaging element (18) for reflecting the optical signal, and a beam deflection system (3) mounted such that the optical signal incident on the imaging element and the optical signal exiting from the imaging element are essentially symmetrical (since the imaging element is a mirror), and the optical signal being subjected to multiple passes between the movable grating and the imaging element (see Fig. 1 and Col. 2, lines 44-46 and 51-55). Onaka et al. and Derickson et al. do not teach the grating as a movable grating, with the movement of the movable grating selecting the

particular wavelength portion. It is well known in the art to adjust a grating within a spectrometer to adjust the wavelength range, and also Onaka et al. teaches in its prior art to use a movable grating to select a particular wavelength portion through movement of the grating (see Col. 2, lines 23-28). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a grating having a wavelength range that covers a measurement range for the DWDM multi-wavelength system, an imaging element for reflecting the optical signal, or a beam deflection system mounted such that the optical signal incident on the imaging element and the optical signal exiting from the imaging element are essentially symmetrical, and the optical signal being subjected to multiple passes between the movable grating and the imaging element, as taught by Derickson et al., and to use a movable grating as the grating, with with the movement of the movable grating selecting the particular wavelength portion, in the system of Onaka et al., to provide efficient separation of wavelengths for monitoring each channel in the DWDM system, and to provide a greater range of wavelength coverage for the system through filter/grating adjustment.

7. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Onaka et al. in view of Derickson et al. as applied to Claim 50, further in view of Tanimoto et al. US Patent No. 6,069,697.

Regarding Claim 51, Onaka et al. in view of Derickson et al. teach the system in Claim 50, according to the appropriate paragraph above. Derickson et al. also teach the movable grating mounted with respect to the imaging element (see Fig 1) and the beam deflection system in a combined array (see Fig. 3A). Onaka et al. and Derickson et al. do not teach the beam

deflection system according to Ebert and Faustie and by approximation in a Littrow array. Tanimoto et al. teach (see Fig. 1) a similar system, with a spectrometer (6) with a beam deflection system by approximation in a Littrow system (see Col. 6, lines 4-6). According to Applicant's provided documents ("The Optics of Spectroscopy" by Lerner and Levinson) regarding a Fastie-Ebert configuration, a Fastie-Ebert instrument consists of one large spherical mirror and one plane diffraction grating (see Section 2.2 and Fig. 6)- hence, a Littrow system (seen in Fig. 6-4 of "Diffraction Grating Handbook, 5th Ed. By Palmer) is a Fastie-Ebert instrument and since Tanimoto et al. teaches a Littrow spectrometer, the spectrometer of Tanimoto et al. is also a Fastie-Ebert instrument. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the spectrometer of Tanimoto et al. in the system of Onaka et al. in view of Derickson et al., to provide controlled wavelength selection and tuning.

8. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Onaka et al. in view of Derickson et al. as applied to Claim 50, further in view of Hamel et al. US Patent No. 5,748,815.

Regarding Claim 53, Onaka et al. in view of Derickson et al. teach the system in Claim 50, according to the appropriate paragraph above. Onaka et al. do not teach the movable grating as a ruled or blazed grating. Hamel et al. teach (see Fig. 5) a similar system, with a grating (70) as a blazed grating (see Col. 6, lines 26-27) for selecting measurement wavelengths (see Col. 5, lines 52-53). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a blazed grating as taught by Hamel et al. in the system of Onaka et

al. in view of Derickson et al., to provide minimal insertion loss for re-transmission of the de-multiplexed signal, as taught by Hamel et al. (see Col. 6, lines 28-29).

9. Claims 54-56 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onaka et al. in view of Derickson et al. as applied to Claim 50, further in view of Wildnauer et al. US Patent No. 5,233,405.

Regarding Claims 54-56 and 58, Onaka et al. in view of Derickson et al. teach the system in Claim 50, according to the appropriate paragraph above. Onaka et al. do not teach means for determining an angular position of the movable grating, the angular position determining the particular wavelength portion, the determining means comprising a high precision light source, a reflecting surface, and a position sensor, as defined in Claim 55, means for moving the angular position of the grating to select the particular wavelength portion, as defined in Claim 56, or the position sensor comprising an incremental scale and a detector, as defined in Claim 58. Wildnauer et al. teach (see Fig. 1) a spectrometer and spectrum analyzer with a movable grating (16) that covers a measurement range (see Col. 6, lines 48-50) with means for determining (92) (see Fig. 7A) an angular position of the movable grating, the angular position determining the particular wavelength portion (see Col. 6, lines 44-50, Col. 12, lines 26-28 and 36-41, and Col. 17, lines 23-26), with a high precision light source (108) for generating a beam, a surface (110) rigidly coupled to the movable grating upon which the beam impinges (see Col. 12, lines 8-12 and 55-57), and a position sensor (112, 114, slits in (110)) for receiving the beam from the surface to determine the angular position (See Col. 12, line 58 to Col. 13, line 19), comprising an incremental scale (slits in (110)) that influences the intensity of the beam at a function of the

point on the incremental scale upon which the beam impinges (see Col. 12, lines 28-31 and 58-64),and a detector (112, 114) for detecting an intensity of light from the incremental scale, the intensity being a measure of the angular position (see Col. 13, lines 1-5), the system also comprising means for moving (90) (see Fig. 7A) the angular position of the grating to select the particular wavelength portion. Onaka et al., Derickson et al., and Wildnauer et al. do not teach the beam as focused or the surface as reflective. It is well known in the art to use focused light in an optical encoder to obtain more accurate position results, and to use a reflective optical encoder in place of a transmissive optical encoder, to save space and provide improved system integration by placing the optical source and receiver at the same location. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the means for determining an angular position of the movable grating and means for moving the angular position of the grating, as taught by Wildnauer et al., using focused light and a reflective surface, in the system of Onaka et al. in view of Derickson et al., to provide fine control over a wide wavelength range, as taught by Wildnauer et al. (see Col. 11, lines 37-43 and Col. 12, lines 26-36), and to save space and provide improved system integration through optimal location of components.

10. Claim 59 is rejected under 35 U.S.C. 103(a) as being unpatentable over Onaka et al. in view of Chung US Patent No. 4,926,429.

Regarding Claim 59, Onaka et al. teach the system in Claim 45, according to the appropriate paragraph above. Onaka et al. do not teach the converting means comprising a means for mixing the optical signal with a tunable reference optical signal to produce a

combined optical signal, and a photodetector for converting the combined optical signal to the electrical signal. Chung teaches (see Fig. 1) a transmitter/receiver system for WDM (see Col. 4, lines 49-55), with converting means (200) comprising a means for mixing (209) the optical signal (103) with a tunable reference optical signal (202) (see Col. 6, lines 13-18) to produce a combined optical signal (in (210)), and a photodetector (211) for converting the combined optical signal to the electrical signal (DATA OUT). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a means for mixing the optical signal with a tunable reference optical signal to produce a combined optical signal and a photodetector for converting the combined optical signal to the electrical signal, as taught by Chung, in the system of Onaka et al., to provide frequency-locking according to a frequency reference for accurate signal reception and channel discrimination.

***Allowable Subject Matter***

11. Claims 41 and 42 are allowed over the prior art of record.

12. Claims 52, 57, and 60-67 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter:

Regarding Claims 41, 42, and 60-67, the invention as claimed, specifically in combination with a DWDM performance monitoring system with an optical signal comprising a

data signal and a tunable reference signal, dividing the optical signal into orthogonal polarized beams and combining them to form a single combined beam, is not disclosed or made obvious by the prior art of record.

Regarding Claim 52, the invention as claimed, specifically in combination with a dielectric optical filter between a movable grating and an imaging element for bandpass filtering of reflections of an optical signal, within a grating spectrometer for determining the performance of a DWDM system, is not disclosed or made obvious by the prior art of record.

Regarding Claim 57, the invention as claimed, specifically in combination with a DWDM performance monitoring system with a movable grating for selecting a measurement wavelength portion, also having moving means including a spring-mass array with torsion bars capable of oscillating coupled to a drive motor, is not disclosed or made obvious by the prior art of record.

### *Response to Arguments*

14. Applicant's arguments with respect to claims 45-67 have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (571)272-2449. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571)272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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PATENT EXAMINER